WHAT IS CLAIMED IS:

1. An optical/electrical converting device for connecting an optical data transmission system, which is composed of apparatuses performing data communication by an optical signal, and an electrical data transmission system, which is composed of apparatuses performing data communication by an electrical signal, and performing data communication between the systems, the device comprising:

a clock supplying unit for supplying a clock synchronized with a reference clock which is held by a master apparatus included in either system;

an electrical signal transmitting unit for inputting a binary optical digital signal from the optical data transmission system, converting the optical signal into a multi-level electrical analog signal synchronized with the clock supplied from the clock supplying unit, and outputting the electrical signal to the electrical data transmission system; and

an electrical signal receiving unit for inputting a multi-level electrical analog signal from the electrical data transmission system, converting the electrical signal into a binary optical digital signal synchronized with the clock supplied from the clock supplying unit, and outputting the optical signal to the optical data transmission system.

2. The optical/electrical converting device according to claim 1, wherein

the clock supplying unit includes:

a first clock recovery unit for recovering a clock based on an optical signal input from the optical data transmission system;

a second clock recovery unit for recovering a clock based on an electrical signal input from the electrical data transmission system; and

a clock selecting unit for selecting a clock recovered by the first clock recovery unit if the master apparatus generating a reference clock is included in the optical data transmission system, and selecting a clock recovered by the second clock recovery unit if the master apparatus generating a reference clock is included in the electrical data transmission system, and

the electrical signal transmitting unit converts the optical signal input from the optical data transmission system into an electrical signal synchronized with the clock selected by the clock selecting unit.

3. The optical/electrical converting device according to claim 1, wherein

the clock supplying unit includes:

a first clock recovery unit for recovering a clock based on an optical signal input from the optical data transmission

system;

a second clock recovery unit for recovering a clock based on an electrical signal input from the electrical data transmission system; and

a clock selecting unit for selecting a clock recovered by the first clock recovery unit if the master apparatus generating a reference clock is included in the optical data transmission system, and selecting a clock recovered by the second clock recovery unit if the master apparatus generating a reference clock is included in the electrical data transmission system, and

the electrical signal transmitting unit converts the optical signal input from the optical data transmission system into an electrical signal, and replaces the clock recovered by the first clock recovery unit with the clock selected by the clock selecting unit while maintaining synchronization.

4. The optical/electrical converting device according to claim 1, wherein

the clock supplying unit includes:

a clock recovery unit for recovering a clock based on an electrical signal input from the electrical data transmission system; and

a clock selecting unit for selecting a clock input from an apparatus, whose clock synchronization is already established, included in the optical data transmission system,

if the master apparatus generating a reference clock is included in the optical data transmission system, and selecting a clock recovered by the clock recovery unit if the master apparatus generating a reference clock is included in the electrical data transmission system, and

the electrical signal transmitting unit converts an optical signal input from the optical data transmission system into an electrical signal synchronized with the clock selected by the clock selecting unit.

5. The optical/electrical converting device according to claim 1, wherein

the clock supplying unit includes:

a clock recovery unit for recovering a clock based on an electrical signal input from the electrical data transmission system;

a clock generating unit for generating a reference clock to which the master apparatus is locked; and

a clock selecting unit for selecting a clock generated by the clock generating unit if the master apparatus locked by the reference clock is included in the optical data transmission system, and selecting a clock recovered by the clock recovery unit if the master apparatus generating a reference clock is included in the electrical data transmission system, and

the electrical signal transmitting unit converts an

optical signal input from the optical data transmission system into an electrical signal synchronized with the clock selected by the clock selecting unit.

6. The optical/electrical converting device according to claim 2, wherein

the electrical signal receiving unit

sends an electrical signal input from the electrical data transmission system to the electrical signal transmitting unit until completion of initialization of the apparatuses composing the electrical data transmission system, and

after completion of the initialization of the apparatuses composing the electrical data transmission system, converts an electrical signal input from the electrical data transmission system into an optical signal synchronized with the clock selected by the clock selecting unit, and outputs the optical signal to the optical data transmission system.

7. The optical/electrical converting device according to claim 3, wherein

the electrical signal receiving unit

sends an electrical signal input from the electrical data transmission system to the electrical signal transmitting unit until completion of initialization of the apparatuses composing the electrical data transmission system, and

after completion of the initialization of the apparatuses composing the electrical data transmission system, converts an electrical signal input from the electrical data transmission system into an optical signal synchronized with the clock selected by the clock selecting unit, and outputs the optical signal to the optical data transmission system.

8. The optical/electrical converting device according to claim 4, wherein

the electrical signal receiving unit

sends an electrical signal input from the electrical data transmission system to the electrical signal transmitting unit until completion of initialization of the apparatuses composing the electrical data transmission system, and

after completion of the initialization of the apparatuses composing the electrical data transmission system, converts an electrical signal input from the electrical data transmission system into an optical signal synchronized with the clock selected by the clock selecting unit, and outputs the optical signal to the optical data transmission system.

9. The optical/electrical converting device according to claim 5, wherein

the electrical signal receiving unit

sends an electrical signal input from the electrical

data transmission system to the electrical signal transmitting unit until completion of initialization of the apparatuses composing the electrical data transmission system, and

after completion of the initialization of the apparatuses composing the electrical data transmission system, converts an electrical signal input from the electrical data transmission system into an optical signal synchronized with the clock selected by the clock selecting unit, and outputs the optical signal to the optical data transmission system.

10. An optical/electrical converting method for connecting an optical data transmission system, which is composed of apparatuses performing data communication by an optical signal, and an electrical data transmission system, which is composed of apparatuses performing data communication by an electrical signal, and performing data communication between the systems, comprising the steps of:

recovering a clock based on an optical signal input from the optical data transmission system if a master apparatus generating a reference clock is included in the optical data transmission system;

recovering a clock based on an electrical signal input from the electrical data transmission system if a master apparatus generating a reference clock is included in the electrical data transmission system;

converting a binary optical digital signal input from the optical data transmission system into a multi-level electrical analog signal synchronized with the recovered clock, and outputting the electrical signal to the electrical data transmission system;

causing a multi-level electrical analog signal input from the electrical data transmission system to synchronize with the recovered clock, and outputting the electrical signal to the electrical data transmission system until completion of initialization of the apparatuses composing the electrical data transmission system; and

converting a multi-level electrical analog signal input from the electrical data transmission system into a binary optical digital signal synchronized with the recovered clock, and outputting the optical signal to the optical data transmission system after completion of the initialization of the apparatuses composing the electrical data transmission system.